DETAILED ACTION

Response to Amendment

1. In response to the amendment received November 12, 2009:

a. Claims 29-46 and 49-59 were pending. (However, claim 59 is cancelled herein by Examiner's Amendment. See below for full details.)

b. The priority issues have been withdrawn in light of the argument. (See below response to arguments for full details).

c. The previous 102 rejection has been withdrawn in light of the inclusion of the limitation set forth in the Examiner's Amendment (made below). The previous 103 rejection has been withdrawn in light of resolving the previously set fort priority issue. (See below response to arguments for full details).

Response to Arguments

2. Applicant's arguments, see pp 2-7, filed November 12, 2009, with respect to the pending claims have been fully considered and are persuasive. The rejection/objection of claims 29-46 and 49-58/foreign priority has been withdrawn. With respect to the priority issue:

Applicant argues that WO 2004/024797 (Kiefer et al.), published March 25, 2004 is not applicable as prior art, as the instant application is a 371 Application filed off of International Application PCT/EP2003/009020 (filed October 2, 2003) (a) is not applicable as art under 102(e) as it is not published in English and (b) is not applicable under 102(a), as the priority afforded to the instant application is the International Filing date of October 2, 2003.

Examiner would first like to noted that Kiefer et al. was not applied as a prior art with a 102(e), as the WO document was relied upon for the rejection (not the US pre-grant publication), and thus such arguments are irrelevant (as applied to issue (a)). However, with respect to issue (b), Examiner submits that Applicant is afforded priority to the October 2, 2003 international filing date under 371 rules. Accordingly, the objection with respect to the priority has been withdrawn. (Subsequently, the 103 rejection relying on Kiefer et al. is also withdrawn, as Kiefer et al. does not constitute prior art.)

With respect to the prior art issue:

With respect to the previous 103 rejection, as applied to previously pending claim 59 (pertaining to the limitation with respect to the concentration of the "phosphoric acid being from 10 to 80 mols of phosphoric acid per mol of a repeating unit of the polyazole polymer"), the rejection relied upon Kiefer et al. to render obvious such a claim limitation. As set forth above with respect to the priority issues, Kiefer et al. is not applicable as prior art. Accordingly, such a rejection has been withdrawn.

With respect to the previous 102 rejections as applied to independent claims 29, 54, and 57 are now moot in light of the changes to the claim limitations (made by Examiner's amendment below). The amendment, as set forth below, incorporates the claim limitations of previously pending claim 59 (pertaining to the limitation with respect to the concentration of the "phosphoric acid being from 10 to 80 mols of phosphoric acid per mol of a repeating unit of the polyazole polymer"). As set forth above, the rejection of such a limitation previously relied

upon Kiefer et al., which is not applicable as prior art. Accordingly, the prior art rejection has been withdrawn. (It is noted that the withdrawal of the rejection with respect to claims 29, 54, 57, and dependents claims of the preceding independent claims lies in the amendment made by Examiner's amendment and is not an indication that Examiner agrees with the arguments set forth pp 2-6 of the remarks filed November 12, 2009 with respect to the combination of US 2004/0062969 (Sakaguchi et al.) as evidenced by "Polyphosphoric Acid Assay" (Innophos).)

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in telephone interviews with Alexander Akhiezer on January 7, 2009 and follow-up correspondences on January 12, 2009, January 14, 2009, and January 19, 2009.

The application has been amended as follows:

a. Amend claim 29 so that it reads (changes underlined for clarity's sake):

A proton-conducting polymer membrane which comprises polyazoles containing phosphonic acid groups and is obtainable by a process comprising the steps:

A) mixing one or more aromatic or heteroaromatic tetraamino compounds with one or more aromatic or heteroaromatic carboxylic

compounds in polyphosphoric acid to form a solution or dispersion, wherein the carboxylic compounds contain at least two carboxylic groups selected from acids, esters, acid halides or acid anhydrides, with at least part of the tetraamino compounds or the carboxylic compounds comprising at least one phosphonic acid group; or

mixing one or more aromatic or heteroaromatic diaminocarboxylic compounds in polyphosphoric acid to form a solution or dispersion, wherein the diaminocarboxylic compounds contain a carboxylic group selected from acids and esters, wherein at least a part of said diaminocarboxylic compounds comprises phosphonic acid groups;

B) heating the solution or dispersion obtained according to step A) under inert gas to temperatures of up to 350°C to form polyazole polymers; and

C) applying a layer using the mixture from step B) to a support, thus forming a membrane on the support; or

D) applying the solution or dispersion from step A) to a support, thus forming a membrane on the support; and

E) heating the membrane formed in step D) under inert gas to temperatures of up to 325°C to form polyazole polymers; and

F) partially hydrolyzing the polyphosphoric acid moieties of the membrane from step C) or step E) until the membrane is self-supporting.

wherein the concentration of phosphoric acid in the membrane of step (F) is from 10 to 80 mols of phosphoric acid per mol of a repeating unit of the polyazole polymer.

b. Amend claim 54 so that it reads (changes underlined for clarity's sake):

An electrode having a proton-conducting polymer coating which is based on polyazoles and is obtainable by a process comprising the steps:

A) mixing one or more aromatic or heteroaromatic tetraamino compounds with one or more aromatic or heteroaromatic carboxylic compounds in polyphosphoric acid to form a solution or dispersion, wherein the carboxylic compounds contain at least two groups selected from acids, esters, acid halides or acid anhydrides, with at least part of the tetraamino compounds or the carboxylic compounds comprising at least one phosphonic acid group; or

mixing one or more aromatic or heteroaromatic diaminocarboxylic compounds in polyphosphoric acid to form a solution or dispersion, wherein the diaminocarboxylic compounds contain a group selected from acids and esters, wherein at least a part of said diaminocarboxylic compounds comprises phosphonic acid groups;

B) heating the solution or dispersion obtained according to step A) under inert gas to temperatures of up to 350°C to form the polyazole polymer; and

C) applying a layer using the mixture from step B) to an electrode, thus forming a membrane on the electrode; or

D) applying the solution or dispersion from step A) to an electrode, thus forming a membrane on the electrode; and

E) heating the membrane formed in step D) under inert gas to temperatures of up to 325°C to form polyazole polymers; and

F) partially hydrolyzing the polyphosphoric acid moieties of the electrode membrane formed in step C) or step E) until the membrane' has a surface hardness,

wherein the concentration of phosphoric acid in the membrane of step (F) is from 10 to 80 mols of phosphoric acid per mol of a repeating unit of the polyazole polymer.

c. Amend claim 57 so that it reads (changes underlined for clarity's sake):

A membrane-electrode unit comprising at least one electrode having a proton-conducting polymer coating which is based on polyazoles and is prepared by the following steps:

A) mixing one or more aromatic or heteroaromatic tetraamino compounds with one or more aromatic or heteroaromatic carboxylic compounds in polyphosphoric acid to form a solution or dispersion, wherein the carboxylic compounds contain at least two groups selected from acids, esters, acid halides or acid anhydrides, with at least part of the

tetraamino compounds or the carboxylic compounds comprising at least one phosphonic acid group; or

mixing one or more aromatic or heteroaromatic diaminocarboxylic compounds in polyphosphoric acid to form a solution or dispersion, wherein the diaminocarboxylic compounds contain a group selected from acids and esters, wherein at least a part of said diaminocarboxylic compounds comprises phosphonic acid groups;

B) heating the solution or dispersion obtained according to step A) under inert gas to temperatures of up to 350°C to form the polyazole polymer; and

C) applying a layer using the mixture from step B) to an electrode, thus forming a membrane on the electrode; or

D) applying a solution or dispersion from step A) to an electrode, thus forming a membrane on the electrode; and

E) heating the membrane formed in step D) under inert gas to temperatures of up to 325°C to form polyazole polymers; and

F) partially hydrolyzing the polyphosphoric acid moieties of the electrode membrane formed in step C) until the membrane has a surface hardness,

wherein the concentration of phosphoric acid in the membrane of step (F) is from 10 to 80 mols of phosphoric acid per mol of a repeating unit of the polyazole polymer.

d. Cancel claim 59.

e. Amend the abstract such that it reads:

A proton-conducting polymer membrane comprising polyazoles containing phosphonic acid groups is obtainable by a process comprising:

A) mixing one or more aromatic or heteroaromatic tetraamino compounds with one or more aromatic or heteroaromatic carboxylic acids or derivatives thereof which contain at least two acid groups per carboxylic acid monomer, with at least part of the tetraamino compounds or the carboxylic acids comprising at least one phosphonic acid group, or mixing of one or more aromatic or heteroaromatic diaminocarboxylic acids, of which at least part comprises phosphonic acid groups, in polyphosphoric acid to form a solution or dispersion;

B) optionally heating the solution or dispersion obtained by step A) under inert gas to temperatures of up to 350°C to form polyazole polymers;

C) applying a layer using the mixture from step A) or B) to a support, thus forming a membrane, and

D) partially hydrolyzing the polyphosphoric acid moieties of the membrane from step C) until it is self-supporting.

Allowable Subject Matter

4. Claims 29-46 and 48-58 are allowable

5. The following is an examiner's statement of reasons for allowance:

None of the prior art of record, alone or in combination, appear to teach, suggest, or render obvious the invention of claims 29, 54, and 57.

Claim 29 teaches the polymer membrane, claim 54 teaches an electrode, and claim 57 teaches a membrane-electrode unit, each comprising the elements recited therein. Notably, all of claims 29, 54, and 57 recite that there is membrane wherein "the concentration of the phosphoric acid...is from 10 to 80 mols of phosphoric acid per mol of repeating unit of the polyazole polymer." None of the applicable prior art of record teach, suggest, or render obvious the use of the disclosed polymer membrane (having a concentration of phosphoric acid from 10 to 80 mols of phosphoric acid per mol of repeating unit of polyazole polymer). The prior art of record (such as Sakaguchi et al.) teach of a polyazole polymer, wherein the polyphosphroic acid is included in the method of preparing, wherein upon polymerization, water is added (thus indicating partial hydrolysis of polyphosphoric acid moities, as previously set forth in rejections; for example see the rejection set forth in the Office Action dated May 11, 2009) (abs; para 0254-0255). However, there is no indication to the concentration as to the phosphoric acid remaining in the membrane, and thus there is no motivation as to include such a phosphoric acid in the claimed molar amount. Accordingly, none of the prior art of record alone or in combination appear to teach, suggest, or render obvious the invention of claims 29, 54, and 57 (having a concentration of phosphoric acid from 10 to 80 mols of phosphoric acid per mol of repeating unit of polyazole polymer). Since claims 30-46, 47-53, 55-56, and 58 are dependent on one of claims 29, 54, and 57, they would be allowable for the same reasons.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should

preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E. W./
Examiner, Art Unit 1795

/Gregg Cantelmo/
Primary Examiner, Art Unit 1795